Abstract

According to prior art, in order to improve conversion efficiency of solar energy in electric current for a solid body solar cell, the continuous metal emitter film is subdivided into a plurality of nano emitters in order to reduce shadowing and recombination loss. The nano emitters comprising, respectively, a space-charge area of extent w in the semiconductor layer to which the minority charge carriers migrate along a diffusion length L, are arranged in a dotted manner on the surface of the absorbing semiconductor layer. In order to improve efficiency further, the inventive photovoltaic solar cell (SZ) is provided with nano emitters (NE) which are embodied in a needle or rib type manner and are separated from each other at a regular distance $D \leq \sqrt{2}L$ and having a penetration depth $T \geq d_{HL} - \frac{L}{2} + w$ in the semiconductor layer (HL). Shadowing, recombination and use of material can be minimized during the simultaneous use of qualitatively reduced-value semiconductor materials, thereby optimizing efficiency by virtue of the precise dimensioning of the metal nano emitters (NE) and the expansion thereof in the semiconductor layer (HL) for complete accumulation of the light-induced charge carrier. A preferred production method can be carried out continuously using a wet or electro or photo-electrochemical technique, thereby preserving energy and reducing costs in the low temperature, especially when producing large, flat solar cells.